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09/763,365	02/23/2001	Teruo Takizawa	108680	4673

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EXAMINER

HOGANS, DAVID L.

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 09/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/763,365

Applicant(s)

TAKIZAWA ET AL.

Examiner

David L. Hogans

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspond ne address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 14-16 is/are pending in the application.
- 4a) Of the above claim(s) 8-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-7 and 14-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of.
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1, 2, 7, 15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by 5,801,444 to Aboelfotoh et al.

In reference to Claims 1 and 15, Aboelfotoh et al. teaches:

- a MOSFET formed on a silicon substrate with a gate insulation film and a gate electrode on the gate insulation film wherein the gate electrode includes a germanium film on the gate insulation film (See Figures 33-35 and column 8 lines 1-9)

In reference to Claims 2 and 16, Aboelfotoh et al. teaches:

- a single crystal, polycrystalline or amorphous germanium film grown by UHV/CVD or other selective epitaxy processes (See column 8 lines 9-11)

In reference to Claim 7, Aboelfotoh et al. teaches:

- a CMOS device wherein at least one of the n-channel or p-channel MOSFET's has a gate insulation film and a gate electrode on the gate insulation film wherein the gate electrode includes a germanium film on the gate insulation film (See Figures 33-35 and column 8 lines 1-9)

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over 5,801,444 to Aboelfotoh et al. in view of 5,216,271 to Takagi et al. in view of 6,124,614 to Ryum et al.

Claims 3 and 14

Incorporating all arguments of Claims 1 and 14 and noting that Aboelfotoh et al. fails to explicitly teach doping the germanium film with p-type impurities.

However, Takagi et al., in columns 2-3 lines 66-01, and Ryum et al., in column 5 lines 12-18, respectively teach doping the germanium film with p-type impurities and generally doping the germanium film with impurities. Examiner notes that it is well known within the art to dope impurities into semiconducting layers to improve electrical properties.

It would have been obvious to one of ordinary skill in the art to modify Aboelfotoh et al. in view of Takagi's et al. and Ryum's et al. teachings of doping the germanium film with p-type impurities and generally doping the germanium film with impurities. Aboelfotoh's et al. modification via Takagi's et al. and Ryum's et al. teachings is obvious because it is well known within the art to dope impurities into semiconducting layers to improve electrical properties.

#### Claim 4

Incorporating all arguments of Claim 1 and noting that Aboelfotoh et al. fails to explicitly teach wherein the gate electrode comprises a multi-layer structure that includes a low resistance conductive film.

However, Ryum et al., in column 5 lines 17-23, teaches a multi-layered gate electrode with a metal silicide contact. Furthermore, Ryum's et al. use of the metal

silicide as a low resistance contact on top of the germanium layer shows its use to be functional.

It would have been obvious to one of ordinary skill in the art to modify Aboelfotoh et al. in view of Ryum's et al. teachings of a multi-layered gate electrode with a metal silicide contact. Aboelfotoh's et al. modification via Ryum's et al. teachings is obvious because Ryum's et al. use of the metal silicide as a low resistance contact on top of the germanium layer shows its use to be functional.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over 5,801,44 to Aboelfotoh et al. in view of 5,216,271 to Takagi et al. in view of 6,124,614 to Ryum et al. further in view of 5,608,249 to Gonzalez.

Incorporating all arguments of Claims 1 and 4 and noting that Aboelfotoh et al., Takagi et al., and Ryum et al. fail to explicitly teach wherein the low resistance conductive film is comprised by a transition metal, a transition metal silicide, or a transition metal nitride film, or a combination thereof.

However, Gonzalez, in Figure 4 and column 6 lines 6-17, discloses the concept of a low resistance conductive film (41) comprised by a transition metal silicide or a transition metal nitride film.

It would have been obvious to one of ordinary skill in the art to modify Aboelfotoh's et al., Takagi's et al., and Ryum's et al. teachings via Gonzalez's teaching of a low resistance conductive film comprised by a transition metal silicide or a transition metal nitride film. Aboelfotoh's et al., Takagi's et al., and Ryum's et al. modification via Gonzalez's teachings is obvious because this is well known within the art to make ohmic contacts. Therefore, it would be well known to apply this conductive film composition to a Germanium layer.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over 5,801,44 to Aboelfotoh et al. in view of 5,216,271 to Takagi et al. in view of 6,124,614 to Ryum et al. further in view of 5,227,333 to Shepard.

Incorporating all arguments of Claims 1 and 4 and noting that Aboelfotoh et al., Takagi et al., and Ryum et al. fail to explicitly teach a multi-layer structure with a polysilicon layer in between a germanium layer and a conductive layer.

However, Shepard, in Figure 6 and columns 4-5 lines 65-10, discloses the concept of a multi-layer structure with a polysilicon layer (76') in between a germanium layer (74') and a conductive layer (76').

It would have been obvious to one of ordinary skill in the art to modify Aboelfotoh's et al., Takagi's et al., and Ryum's et al. via Shepard's teaching of a multi-layer structure

with a polysilicon layer in between a germanium layer and a conductive layer. Aboelfotoh's et al., Takagi's et al., and Ryum's et al. modification via Shepards teachings is obvious because silicide layers are known to provide low resistance contacts. Therefore, it would be well known to apply this conductive film composition (polysilicon and metal) to a Germanium layer.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-7 and 14-16 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

**8. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (703) 305-3361. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

dh

September 23, 2002

*C. Chaudhuri*  
Chandra Chaudhuri  
Primary Examiner